

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

- 1                   1.       (Original): A method for identifying protocol encapsulation in received  
2 network data comprising providing language definition including a grammar; receiving incoming  
3 network data and processing it in accordance with a formal language processing technique using  
4 said language definition, said processing including and parsing incoming said network data using  
5 said grammar, said network data being organized into data packets.
- 1                   2.       (Original): The method of claim 1 wherein said grammar is a grammar  
2 graph, the method further including providing a deterministic finite automaton (DFA)  
3 representing said grammar graph.
- 1                   3.       (Original): The method of claim 1 further including scanning said  
2 incoming network data using lexical token scanning to produce plural lexical tokens, said step of  
3 parsing including parsing said lexical tokens.
- 1                   4.       (Original): The method of claim 3 wherein said lexical scanning includes  
2 providing a set of regular expressions.
- 1                   5.       (Original): The method of claim 3 further including providing a  
2 deterministic finite automaton (DFA), said DFA including a representation of said lexical tokens  
3 and said grammar, said step of scanning including recognizing lexical tokens contained in said  
4 data packets using said DFA, said step of parsing including identifying grammatical structure  
5 among said lexical tokens using said DFA to identify protocol encapsulation in said incoming  
6 network data.

1                   6.       (Currently amended): In a data packet network switching device, a  
2 method for processing data packets comprising:  
3                   providing a language definition including a grammar;  
4                   receiving plural data packets, each having a length not necessarily equal to one  
5 another; and  
6                   for each data packet, processing it according to a formal language processing  
7 technique using said language definition including lexically scanning said data packet to produce  
8 plural lexical tokens, parsing said lexical tokens using said grammar to produce one or more  
9 identified protocols, and processing said data packet based on said identified protocols.

1                   7.       (Original): The method of claim 6 further including compiling said  
2 grammar to produce a grammar graph.

1                   8.       (Original): The method of claim 7 wherein said lexical scanning includes  
2 providing regular expressions for identifying said lexical tokens.

1                   9.       (Original): The method of claim 8 further including compiling said  
2 regular expressions are into a deterministic finite automaton (DFA).

1                   10.     (Original): The method of claim 9 further including incorporating said  
2 grammar graph into said DFA.

1                   11.     (Currently amended): In a data packet receiving and forwarding device, a  
2 method for processing data packets comprising a stream of data, said method comprising:  
3                   receiving a description of grammar rules in the form of a grammar packet  
4 classification language;  
5                   compiling said grammar packet classification language to produce a grammar  
6 graph;  
7                   configuring a programmable grammatical packet classifier with said grammar  
8 graph;

9                    processing said data stream in accordance with a formal language processing  
10 technique using said grammar packet classification language including parsing said data stream  
11 with said grammatical packet classifier to identify a protocol structure in a received data packet;  
12 and

13                    processing said received data packet in accordance with said protocol structure.

1                    12.    (Original): The method of claim 11 further including:  
2                    receiving a description of classification rules in a lexical classification language;  
3                    compiling said classification language to produce a deterministic finite automaton  
4 (DFA) comprising plural states;  
5                    configuring said hardware packet classifier with said DFA; and  
6                    scanning said data stream with said hardware packet classifier to produce plural  
7 lexical tokens,  
8                    wherein said parsing is a step of parsing said lexical tokens.

1                    13.    (Original): The method of claim 12 wherein said grammar graph is  
2 incorporated into said DFA.

1                    14.    (Original): The method of claim 12 wherein said lexical classification  
2 language includes regular expressions.

1                    15.    (Original): The method of claim 14 wherein said regular expressions  
2 include arithmetic and logic operations.

1                    16.    (Original): The method of claim 15 wherein said regular expressions  
2 further include skip operations.

1                    17.    (Original): The method of claim 16 wherein said regular expressions  
2 further include data storage operations.

1           18.   (Currently amended): A network data packet classifier comprising:  
2           an input port for receiving network data packets comprising a stream of data;  
3           a memory assemblage configured with data representing a deterministic finite  
4 automaton (DFA), said DFA defined by a language definition and representing a grammar graph  
5 and plural regular expressions; and  
6           decompression logic operatively coupled to said memory assemblage and  
7 configured to process said stream of data according to a formal language processing technique  
8 using said language definition including a step to scan said stream of data with said DFA to find  
9 a matching one of said regular expressions thereby producing plural lexical tokens,  
10          said decompression logic further configured to parse said lexical tokens with said  
11 DFA to identify a protocol structure in a received network data packet,  
12          wherein processing of said network data packet depends on said protocol  
13 structure.

1           19.   (Original): The classifier of claim 18 wherein some of said regular  
2 expressions include arithmetic instructions and logic instructions, said memory assemblage  
3 further configured to contain said instructions, the classifier further including an arithmetic logic  
4 unit operatively coupled to said decompression logic and configured to execute said instructions.

1           20.   (Original): The classifier of claim 19 further including at least one register  
2 operatively coupled to said arithmetic logic unit, said arithmetic logic unit further configured to  
3 store data into said register in response to a save instruction.

1           21.   (Original): The classifier of claim 19 further including skip logic  
2 operatively coupled to said logic component and configured to skip over an amount of data in  
3 response a skip instruction.

1           22.   (Original): The classifier of claim 18 wherein said network data packets  
2 can vary from one packet to another.

1                   23.     (Original): The classifier of claim 18 wherein said DFA is in compressed  
2 form.

1                   24.     (Original): The classifier of claim 23 wherein said DFA comprises plural  
2 non-default states and plural default states, and said memory assemblage comprises a base  
3 memory, a next-state memory, and a default-state memory; said base memory configured to  
4 contain address locations of said next-state memory, said next-state memory representing all of  
5 said non-default states, said default-state memory representing all of said default states.

1                   25.     (Original): The classifier of claim 24 wherein said memories are random  
2 access memories.

1                   26.     (Original): The classifier of claim 24 wherein said memories are read-  
2 only memories.

1                   27.     (Currently amended): A network packet classifier comprising:  
2 means for receiving an incoming network packet; and  
3 means for identifying protocol structure in said network packet including means  
4 for processing said network packet in accordance with a formal language processing technique  
5 using a language definition, including a step of scanning to match patterns in its constituent data  
6 against plural regular expressions to produce lexical tokens and means for parsing through said  
7 lexical tokens using a grammar, said regular expressions and said grammar being defined by said  
8 language definition.

1                   28.     (Original): The classifier of claim 27 wherein said means for scanning  
2 includes a memory component configured with data to represent a deterministic finite automaton  
3 (DFA).

1                   29.     (Original): The classifier of claim 28 wherein said memory component is  
2 further configured to include said grammar.

- 1                   30.     (Original): The classifier of claim 27 wherein said regular expressions
- 2     include arithmetic specifiers and said means for classifying includes an arithmetic logic unit
- 3     configured to perform operations in accordance with said arithmetic specifiers.